2315, Goshen Community Schools

PROJECT ABSTRACT

Goshen Schools will partner with Westview Schools on this project in order to increase math achievment for both schools. Goshen Schools is an urban school corporation in its diversity (38% Latino) and in its socioeconomic description (68% F/R Lunch). Westview School Corporation is a nearby rural school with diverstiy (45% amish population) and higher student achievement levels. Both schools are interested in innovative and creative ways to increase the level of engagement in mathematics and therefore, to increase student achievement in math. Westview has already implemented a piece of software that has been very helpful to their students - the same piece of software that came up repeatedly during Goshen Schools' research on effective strategies, thus a partnership seems to be a great fit for both districts.

In today's global ecocomy, the ability to think and reason mathematically is definitely a 21st Century essential skill. According to the US DOE, students with a strong understanding of mathematics are better prepared to compete in the global job market. Also, the National Teachers of Mathematics states that students who understand and can do mathematics will have signifcantly enhanced opportunities and otpions for their futures.

This data and research has led Goshen Schools to a sense of urgency for the need to increase our student achievment in mathematics. (Also, the district has used other funds to greatly enhance and improve student achievment in reading and therefore feels the need to address mathematics instruction more forthrightly.) The district curriculum leaders believe that we need to rethink expectations, provide more research and technology based methods for delivering math instruction, and to find more research based intervention methods to assist when students do not learn the material the first time. Just repeating the lesson in the same way is not helpful to students who are struggling to understand.

The district is currently working with Marzano and Associates to identify core standards that will be taught at each grade level, develop learning goals from those standards and develop scoring rubrics that accompany those learning goals. In this way the district will provide a viable curriculum and know that each student is learning the same content at each grade level, no matter in which school the student is located. To accompany these learnign goals and rubrics, innovative technology tools, such as interactive tablets, classroom response systems, and document cameras will be provided, along with the training to effectively use these technology tools. In addition, the district wants to purchase software that can help students to learn mathematics concepts in a differnt way (technology based) if they had trouble learning it in the classroom, as well as be able to practice skills in a safe environment (technolgoy based) if they need the extra practice on a skill.

Westview Schools, in addition to the math goals, desires to add a STEM Lab for their students. Students will explore advanced technologies such as lasers, robotics, web design tools, computer interfaces and other pre-engineering and digital tools.

Therefore, the Learning Technologies Grant, Cadre III, supports both Goshen Community Schools and Westview School Corporation in their ongoing efforts to: 1) Promote math student learning and promote a culture of academic excelllence in math achievement and 2) Improve instructional quality in classrooms in mathematics instruction and 3) and embrace innovative technologies that help engage students and develop 21st Century skills for both teachers and students.

In addition, the Learning Technologies Grant, Cadre III, will positively impact at both partner schools: 1) the level of student achievement in mathematics as measured by ISTEP, Acuity and M-Class, 2) the instructional strategies employed by teachers in mathematics, and 3) the # of students who sign up for and achieve in Alg.I.

NEEDS/BASELINE

This grant will serve the Goshen Communtity Schools students that are at-risk in math achievment, K-8. Our math achievement, as measured by Istep in the spring of '09, was below the state average at all Istep grades, 3-8. Third grade was 12 points below state average, fourth grade was 14 points below the average, 5th was 8 points below average, 6th was 7 points below average, and 8th was 4 points below average. As one can see, 8th grade was the closest to the state average, only 4 points below. This shows that as students stay in the GCS system, they do improve, but this entire situation is not acceptable - math achievement must be improved! GCS has already implemented several intiatitives to improve math achievement, but there is still much room to grow! We have a full time math coach that trains math mentors in each of the 7 elementary buildings. GCS uses Trailblazers math curriculum, which is a research based curriculum developed by the Universtiy of Chicago, which focuses on analysis and problem solving skills. The math coach trains the math mentors in successful lesson planning and activities that will successfully complement the math curriculum and then the math mentors in turn coach the teacahers in their buildings to use these strategies. These strategies rely heavily on using math manipulatives to help students understand the abstract math prinicples. This grant will then assist the math coaches and teachers to identify students that still need addditional assistance and practice and allow them to use software (Waterford Early Math & Science and ALEKS)to assist these struggling students. In addition, the grant will allow teachers to be trained in the integration of technology into the classroom by using engaging strategies for classroom work and for assessments by using the classroom response systems (clickers) and the interacative pads. In addition, it should be noted that the overall F/R lunch rate for Goshen Schools is at 68% and several of the elementary schools are above 80%. Also, the

district is at 37% ELL population. Thus, it is easy to see that the district has distinct needs to help children from poverty to develop cognitive structures to understand math concepts.

For Westview, even though the math achievement rate on ISTEP is over 80%, it is a goal to reach 90% or higher on ISTEP passing rates. The Westview F/R lunch rate is at 44% for the district. This grant would serve students in grades 5-12. Since the district enrollment is 45% Amish through grade 8 (they tend to drop out after 8th grade via an exclusion with the state based on religious reasons) it is imperative to teach as many STEM skills to the Amish students while they are in the public school. The Amish population is now working in the local factories and in many industries as they are not able to make a living on farms any more. Therefore, these skills are very important in order for them to be employable. In addition, many members of the Amish community have started their own cottage industries in woodworking, carpentry, leatherwork, quiltmaking, and other related businesses, again, since they are not able to make a living on farms any longer. These STEM skills are also very important in these businesses.

GOALS/OBJECTIVES

One of the main student outcomes that is desired is increased student achievement in mathematics, ultimately as measured by ISTEP, but also as measured by benchmark assessments that are used by Goshen (Mclass & Acuity). The first goal is to at least be at the state average in math scores in grades 3-8. In addition, we would like all acuity assessments for each student to approach the 75% proficient marker. Over time, we hope to be above the state average in math achievemnt as measured by the ISTEP tests and to increase our levels of achievement on the ECA Algebra 1 Test. This will follow if we can increase math achievement at K-8 grades.

Another student outcome that we hope for is to increase motivation for students to learn math. If students can be more successful in math at younger grades, they will learn to believe that they can do math and see themselves as successful math learners. This is why it is imperative to provide intervention as soon as we notice students not understanding a math concept. In addition, by teachers learning to use classroom technology, such as clickers and interactive pads, research shows that this will be more engaging for students and thus, will also be a motivator for them. So, the combination of earlier intervention and therefore, students believing they are capable math learners, with more engaging math lessons by the integration of technolgoy, we believe will provide higher student achievment for GCS students.

At Westview, ALEKS is used as an intervention for students who struggle with math. Teachers at Westview believe that ALEKS enables them to effectively differentiate instruction. Topics taught through ALEKS have yielded a high knowledge retention rate for students that have demonstrated low

retention of math concepts. Westview teachers report that they would not be able to effectively reach the needs of every student in their classroom if it were not for the ALEKS software. It is our experience that ALEKS which is based on Knowledge Space Theory, accurately assesses knowledge for mathematics and effectively delivers instruction. Westview would like to expand the use ALEKS to include grades 5-12 to augment the math curriculum and to offer individualized mastery-based instruction. Westview¿s goal is to improve performance of all math instruction and have 80% of students who retake the Algebra I graduation test pass after completing the ALEKS curriculum, as well as achieve 90% passing ISTEP Math.

Westview also wants to raise the level of technology literacy by providing the STEM lab to its students. Society today is marked by accelerating change. We live in a connected world where technology and digital resources enable routine tasks, even highly complex routine tasks, to be completed anywhere in the world using knowledge and expertise from around the globe. Students must be accustomed to accessing information they need online, processing that information through interactive digital communication tools, and working with that information in real time together with others to build skills for better decisions, effective communications, and for efficient problem-solving. Westview believes that infusing technology into the curriculum can help transform education. At Westview we understand that technology and digital resources improve student engagement and learning. We know that technology tools and strategies better prepare students for their futures and for a lifetime of learning. Our goal is to further build support for technology by creating a technology lab.

METHODS/ACTIVITIES

The curricula that will be used includes:

-Waterford Early Math & Science software (Goshen, Grades K-2). The Waterford program is a comprehensive educational software program designed to build math and science skills and concepts in the early grades. The program's capability to individualize lessons, assess and track student progress, and reteach lessons is aimed at keeping potentially at risk students at grade level. Goshen Schools is using the Waterford Early Reading program and is experiencing positive results and believes that the math program could do the same for math achievement. Research with schools already using the WEMS program shows that the program is especially effective with ELL learners. The reserach shows that even though ELL students had the lowest pretest scores in math, they received the highest posttest scores (above the national mean) at the end of a year of using the program.

-ALEKS software (Goshen,Grades 3-8) & (WV,5-12). In contrast to other online learning programs, ALEKS avoids multiple choice questions and uses input tools that mimic what would be done with paper and pencil. When students first log on to ALEKS they begin a diagnostic assessment to create a picture of knowledge for each student which is represented by a multicolor pie chart or ¿learning model¿. The learning model offers a choice of topics that each student is ready to learn. Practice problems are then offered that teach the topic. These problems have enough variability that students can only get them

consistently correct on understanding the core principle defining the topic. If students don't understand a particular problem, they can always access a complete explanation. Once students can consistently get the problems for a given topic correct, ALEKS moves to another topic. As the student learns new topics, ALEKS updates its pie chart or learning model of the student's knowledge. Students can observe the most current summary of what they know and what they are ready to learn. To ensure that topics learned are retained in long term memory, ALEKS periodically reassesses students, using the results to adjust each student's knowledge of the course. Because students are forced to show mastery through mixed question assessments that cannot be predicted, mastery of the ALEKS course means true mastery of the course. ALEKS is an online product and it keeps server statistics that measure how often students succeed at learning a concept. When ALEKS determines that each student is ready to learn an item, that student is able to learn it a very high percentage of the time. The average historical learning rate for students with ALEKS is approximately 90%. Also,most of the topics are available in both English and Spanish.

-Teachers will be trained in the effective use of the Waterford and Alek software to offer effective intervention for students who struggle in the classrooms to master mathematics principles. Teachers will also be trained to properly use the classroom clickers and interactive pads to engage students in the lessons, assessments and other classroom activities that revolve around math. The GCS math trainer/coach will help develop lessons and activities that correlate to the Math Trailblazers curriculum. Clickers responses can be multiple choice, numeric, true/false, or yes/no. Using a projector with the clickers allows teachers to display questions, class results, and any media needed for the class. This system supports all learners by engaging them, providing instant feedback, increasing communication, and providing data for formative assessment. Evidence from a number of studies points to potential benefits of student response systems, including increased participation and engagement, improved conceptual understanding, and better feedback to students and teachers about what they know and can do. Significant learning gains can occur when teacher¿s questions are used to deepen students¿ higher-order thinking.

PROFESSIONAL DEVELOPMENT

Teachers have always used each other for good ideas to improve their instruction. The goal then is to provide teachers with time, resources, and instruction toward exemplary integration of technologies into the classrooms. Neighboring school districts can develop effective instructional strategies by working cooperatively. Westview and Goshen will work together to build professional development opportunities that support the initiatives of this grant. Professional development of the ALEKS initiative will involve collaboration between teachers at Westview who have successfully implemented ALEKS with teachers at Goshen who seek to use it as a tool for improving math instruction and achievement. Further training on ALEKS will be integrated with this collaboration so that teachers from both school districts improve the effectiveness using this technology.

One way to encourage teachers to use online professional development would be to offer unit credit which both districts accept for licensure and salary scale increments. Westview has worked collaboratively with Indiana University and Chapman University to offer courses using approved local instructors from both universities and online opportunities. Westview and Goshen will work together to continue this offering in the areas of technology addressed in this grant application. Online resources such as Teachers¿ Domain (http://www.teachersdomain.org) offer free online media resources and professional development courses for teachers. Another learning for Educators (http://www.aptv.org/APTPlus/ELearning/index.asp) is a website sponsored by the US Department of Education to support professional development programs that address teacher quality and student achievement goals. Both resources support Indiana standards and draw from shows like NOVA, Frontline, and American Experience. Together, with the collaboration of local experts, these resources are a great way of incorporating technology in the classroom to teach Science, Math, and English Language Arts. With this cooperative relationship of technology professional development established, future topics between the two districts could include web-enhanced lessons, virtual field trips, best Internet educational resources, teaching using the Web, data-driven decision making, wikis, blogs, podcasts, data-based school reform, planning for curriculum integration of technology, and internet safety in schools.

The first collaborative sessions between the two schools will be organized for the summer of 2010 and will continue during the 2010-2011 school year.

In addition, GCS has a staff developer for technology on staff this year, and there is a possibility of continuing the position for next year. This staff developer, along with our disctrict math trainer/coach, will team up to develop lessons and intervention plans that utilize the classroom response systems and the interacative pads to effectively engage students. They will then devise a plan to systematically train the teachers in the uilization of these techniques. Subs will be hired for teachers for .5 day for the intial trainings. All GCS staff meet in Professional Learning Community teams at least weekly, some meet more than that. These PLC meetings will then be the basic unit of time in which these training sessions will be continued. These two coaches will be available to go to individual classrooms to offer assistance and to show how to use the items as needed.

Trainers from the two software companies will also come on-site to provide training sessions here for our teachers and coaches to learn about the effective use of Waterford Early Math & Science and the AlEKS Math software. (Westview teachers will be invited to Goshen for this training as well.) Subs will be procured for teachers to attend the training sessions. Follow up training will also occur then during the PLC meetings that were noted above.

FORMATIVE/SUMMATIVE EVALUATION

Goshen will measure success by student achievement as shown on ISTEP, as well as on benchmark assessments in MClass and Acuity, grades 3-8. As noted earlier, the first goal is to attain at least state average on ISTEP math tests, 3-8, with a continuing goal of increasing above state average. It is believed that these intitiatives will also increase the level of achievement on the ECA Alg. I test. On Acuity and M Class testing, we hope to see students achieving at at least the 75% level. If the programs are implemented during the second semester of the 2009-2010 school year, then progress should be seen by the spring of 2011 school year ISTEP tests, with earlier benchmarks (MClass and Acuity scores) at the end of the 2009-2010 year already showing improvments, along with the benchmarks during the 2010-2011 year.

Also, Goshen will measure the progress and succeses of the intitiative by principal observation and by the District Council group, which helps to oversee the curuiculum and its effectiveness for the district. This will be more of an informal type of measure, perhaps, but still essential nonetheless. Principals will help select teachers who will receive the clickers and interactive pads and will be responsible to engage the teachers in goal setting regarding the integration of the technology in to classroom instruction and to oversee the results. Also, principals will be responsible to make sure all the K-2 teachers are involved in the WEMS training and the appropriate teachers are involved in the ALEKS training. However, the most important measure will be the success that is seen on standardized assessments, such as ISTEp, Acuity and MClass.

Westview will also measure progress and success by the use of NWEA test scores and by ISTEP and ECA scores, with the goal of reaching 90% passing on ISTEP Math and 80% on ECA Algebra I.

LOCAL MATCH

$107,600

Local funds from both schools (Goshen will contribute 47,600 from local funds and Westview will contribute 60,000 from local funds) will be used to help puchase the needed technology items, such as purchasing computers and projectors, replacing student computers to house the software if needed and by purchasing additional sets of classroom response systems and interacative pads and document cameras to help with the classroom implementation of the technology devices. There are also many "in kind" contributions that the technology staff from both schools will be providing for the successful implementation of these inititatives. The tech staff will need to learn about the clicker and interactive pad software and make sure that this software and therefore, the devices, will work properly with the current networks. They will also assist in loading the software that is part of this grant and making sure that everything is working properly for students and teachers.

PARTNERSHIPS

Westview is a higher achieving school district than Goshen, plus they are using the ALEKS software already (they have it for a trial period) and are experiencing some great results and are finding that it is very helpful. They also report that the software itself is very engaging for students. At Westview, ALEKS is used as an intervention for students who struggle with math. Teachers at Westview believe that ALEKS enables them to effectively differentiate instruction. Topics taught through ALEKS have yielded a high knowledge retention rate for students that have demonstrated low retention of math concepts. Westview teachers report that they would not be able to effectively reach the needs of every student in their classroom if it were not for the ALEKS software. It is Westview's experience that that ALEKS, which is based on Knowledge Space Theory, accurately assesses knowledge for mathematics and effectively delivers instruction. Westview would like to expand the use ALEKS to include grades 5-12 to augment the math curriculum and to offer individualized mastery-based instruction. Westview¿s goal is to improve performance of all math students and have 80% of students who retake the Algebra I graduation test pass after completing the ALEKS curriculum.

(Knowledge Space Theory, upon which the ALEKS system was constructed, was thoroughly explored in "Knowledge Spaces" (Falmagne and Doignon, 1999). Over three hundred publications further support their findings.)

Therefore, it is the belief of the people who have collaborated to write this grant, that further collaboration between the teachers of the two distircts would be greatly beneficial to both, but in this case, especially to Goshen teachers. As Westview continues to build up expertise in the use of the ALEKS program, they will share with Goshen to also build their capacity. In addition, both schools are working to use more classroom technology, such as clickers and interactive pads, in order to more effectively deliver instruction, in this case, mathematics instruction. Inasmuch, the collaboration fits in that manner as well. Westview is currently using clickers in two Algebra I classes and believe that the clickers are successful in motivating students. The instant feedback that they provide is highly effective for students.